the abdomen of a crab, is in reality the abdomen of an arachnid, of which six species are now known, one from the coal measures of Arkansas.——In A. Walter's article on the morphology of Lepidoptera in the Jenaische Zeitschrit for May, we have an account of the mouth-parts of Acentropus.——The transformations of *Paraponyx oryzalis*, an insect pest of the rice-plant in Burma, are described and well figured by J. Wood-Mason, in a pamphlet printed in Calcutta. Its larva is aquatic and breathes by tracheal gills. We wish the author had given more detailed sketches of the gills and their relation to the body.——We omitted to note Kowalevsky's contribution to the post-embryonal development of the Muscidæ in the Zoologischer Anzeiger for Feb. 23, 1885.

ZOOLOGY.

THE SIGNIFICANCE OF THE CELL NUCLEUS TO THE PROBLEM OF HEREDITY.—The results of the later researches upon fertilization and cell division, have tended to make biologists view the cell nucleus as of pre-eminent inportance for the life of the cell. In 1884, Kölliker, in his Entwickelungsgeschichte, stated, that since fertilization consists essentially in the fusion of a male with a female pronucleus into one segmentation nucleus which entails its hermaphrodite character upon its offspring of cell generations during ontogenetic development, this fact gives us the true reason why, and how every organism resembles its parents. The last two years have been fruitful in discussions of the problem of heredity in the light of nuclear investigations and have stimulated Kölliker to expand the above statement with more completeness and detail in the paper[1] of which this article is an abstract.

From our present knowledge of the biology of the cell nucleus we may draw certain conclusions of great value as a basis for the discussion of the problem of heredity, as follows:

The nucleus, and it alone, contains a substance which possesses the power of building up an organism according to specific characters, making it resemble the parents from whieh the nucleus originally came—in other words, possesses the hereditary power.

This follows from:

(*a*) *The nature of the spermatozoön:*

We know that but one spermatozoön is needed in the fertilization of one egg; we know that this must carry the hereditary traits of the father which he received from his ancestors both male and female; each spermatozoön is a nucleus.

Kölliker, in 1844, held the spermatozoön to be the equivalent of a cell, but later came to the conclusion that it represents a nucleus. Other biologists agreed with Kölliker so far as the *body* of the spermatozoön is concerned; but the *flagellum*, they said represents the cell protoplasm; and hence a spermatozoön may

[1] "Die Bedeutung der Zellenkerne für die Vorgänge der Vererbung." Zeitschrift für Wissenschaftliche Zoologie. Band XLII, erstes heft. July, 1885.

still be the equivalent of a cell. This may be true, for instance, says Kölliker, for trematodes; but he has shown that for the higher vertebrates the spermatozoa are, in toto, nuclei. It therefore follows that in the spermatozoa of lower animals the nucleus is the necessary fertilizing part, the flagellum serving merely as a locomotor organ, being later absorbed by the yolk. The pollen grains of phanerogams are also nuclei.

(*b*) *The phenomena of fertilization:*

Since Bütschli, in 1872 discovered the two pronuclei in the newly fertilized egg, the phenomena of nuclear conjugation have been carefully studied, especially by O. Hertwig, Fol, and Van Beneden. It is agreed that the male element penetrates the yolk and unites with a portion of the egg-nucleus; but in some important details there is disagreement. The most complete observations have been made on *Ascaris megalocephala* by Van Beneden and by Nussbaum. These observers agree that only the nucleus of the zoösperm forms the male pronucleus; though Van Beneden, even here, finds a "perinuclear zone" which takes no part in the fertilization. It is also agreed that before being fertilized, or conjugating with the male pronucleus, the egg-nucleus throws off a portion of itself in the polar globules, by a complex process resembling indirect cell division. In this process it is generally agreed that the nuclear figure is divided equatorially; but Van Beneden strongly insists that the division is meridional. He further thinks the germinal vesicle is not an ordinary cell nucleus because *all* the chromatin is in the nucleolus.

Minot, Balfour and Van Beneden think all cells are hermaphrodite; and that before conjugation can take place the male cell must lose its female nuclein, and the female cell its male nuclein which is passed over into the polar globules. But against such an hypothesis there are grave objections.

(1) It is known that in the processes of spermatogenesis in many animals, no part of the spermatogonia is lost. (2) Usually two polar globules are successively formed by the repeated halving of the egg nucleus. Now to get rid of the male nuclein this substance must be so distributed as to be separated by the plane of division from the remaining or female nuclein; and then, the male nuclein would be lost in the first globule and there would be no need of a second. (3) We know that the spermatozoön confers hereditary traits from both father and mother upon offspring; and likewise for the female pronucleus. Therefore we conclude, the *pronuclei are essentially in their nature hermaphrodite.*[1]

Kölliker plausibly suggests that the function of the polar globules is simply to reduce the size of the egg-nucleus comparable to that of the male pronucleus.

[1] This word, hermaphrodite, means simply, that hereditary powers from two lines of ancestry, indefinitely dichotomously compounded, are combined, and not what we popularly understand by the term.—*J. N.*

The general law of fertilization, stated by Strasburger for plants, and which we see from the above holds also for animals, is:

Fertilization consists essentially in the conjugation of male with female nuclei; these are ordinary cell nuclei; and the cytoplasm takes no part in the process.

It is therefore erroneous to speak in a general way of the cell protoplasm as carrying the hereditary powers. Of the many writers who have treated this subject, only three or four have given more definite statements. Nägeli calls that substance *idioplasm*, which controls or determines the specific characters of the cell, but does not limit it to the nucleus as does Kölliker and Born. Strasburger distinguishes between two sorts of idioplasm, that of the cell (cyto-idioplasm), and that of the nucleus (karyo-idioplasm).

In the nucleus exists a substance of definite morphological and chemical character, known as nuclein or *chromatin*. *With this substance the idioplasm must be conceived as connected.* (1) The chromatin of the male pronucleus unites with that of the female pronucleus to form the chromatic figure of the segmentation nucleus. According to Van Beneden there is no union, but the chromatin loops of the pronuclei remain separate so as to give the segmentation nucleus a double character, morphologically, one-half being distinctly male and the opposite, female; and this holds true of all its offspring. But Nussbaum found that before segmenting, the nucleus has a stage in which the chromatin forms a single filament. Furthermore Van Beneden's own figures do not seem to Kölliker, to support his view. (2) The processes of karyokinesis show how important it is that the chromatin should be divided between the daughter nuclei in a definite way. It is natural to suppose that to distribute the hermaphrodite idioplasm to the daughter cells, so that each shall get its proper amount, must be a delicate process.

We have now to inquire how the idioplasm effects the work of heredity.

In the development of an egg into an adult there are two moments at work. First, the cells multiply until a sufficient number of cells needed by the organ is produced; second, these cells are separated into groups and are differentiated into the various tissues. We may refer to the cambium zone of plants for a familiar illustration.

The structural characters of any organism depend on these factors: (1) cell *division*, and (2) cell *growth*; both as to (a) *quantity*, and (b) *quality*.

Cell multiplication, if great, will produce a large organ; if less, a smaller. The multiplication may be uniform or may be more rapid at certain points. Thus in the arm rudiment, five points of rapid cell division alternate with points of rest, and the five fingers are produced. Lastly, the cell division may take place in one,

two, or three planes, and give rise accordingly to very different aggregates.

As to cell growth, the size will depend directly on it; but like multiplication, growth may affect some cells and not others; again, like multiplication, cell growth may take place in one, two, or three dimensions.

We can now readily see that *the quantity and quality of cell multiplication and cell growth, according to a specific type of combination for the different organs and thus for the whole organism, builds up the individual with its specific characters.*

Now, the nucleus governs cell multiplication. (1) Division of the nucleus leads in cell division. (The author here shows that certain apparent exceptions are not really so.) (2) The position of the nuclear spindle determines the plane of division.

The *nucleus* also *governs cell growth.*

(1) Young and active cells have conspicuous nuclei, while cells that have done their work are without them. (2) The size of the nucleus increases as the cell increases (cf. Actinosphærium). The nucleus in large cells may separate into many parts so that every portion of protoplasm shall have a nucleus to preside in it. In protozoa these nuclei fuse again before division of the cell, while cases where the mass breaks up without this union are where the nuclei have become independent cells, viz: swarm spores. (3) Artificial division of Protozoa, shows that pieces without a nucleus do not grow. (4) Free cell formation may be considered as due to the fusion of minute nuclei (vid. Berthold, Mitth. der Zool. Stat. Neapel, ii, p. 78) and around the nucleus thus arising a cell is formed. (5) As several of Haeckel's innucleate monera have shown nuclei, when treated with appropriate reagents, Kölliker expects that all will do so when investigated by the methods of an advanced staining technique. (6) The activity of the nucleus is shown by the rays that stream from it in the protoplasm, and by the active manner in which it reacts towards stains.

From this we conclude, that the nucleus has great and controlling significance for the cell, being in active relation to the protoplasm.[1] Some authors have given it the function of manufacturing albumen, chlorophyll, etc. The structure of the cell, in fact its life history, is conceived to depend on the nucleus, whose *idioplasm has a minute structure of a definite type for each species;* and on this structure will depend the method of its work and how it shall react towards external influences. Modifying forces

[1] Pfitzner, in a recent paper (Zur Bedeutung des Zellkerns, Morph. Jahrbuch xi, 1, p. 54), calls the chromatin the "*ground substance of life.*" He also shows, by the application of a new method of staining, that the nucleoplasm or achromatin remains distinct from the cytoplasm during all the stages of karyokinesis; that many so-called multiple nuclei are separated portions of chromatin imbedded in a continuous matrix of achromatin; and that modern cytologists have generally applied the term *nucleus,* to only the chromatic portion, wholly ignoring the achromatic.—*J. N.*

to influence heredity must affect this structure and thus only, can produce variation.

We have finally to inquire, what are the changes which the idioplasm suffers during the ontogenetic development of an organism? *Each cell which results from the segmentation of the first embryo nucleus must be the equivalent, in all respects, of this nucleus, and, theoretically, capable of reproducing the individual.* Weismann has a theory opposed to this view. According to this author, only the very earliest cells produced in segmentation are set apart as germinal cells; all others have lost the power to be germinal cells, but must invariably differentiate into the organs of the body. Thus we really have no death, but only a series of germinal cells which gives off, by cell multiplication, from the fertilized egg, a mass of cells which differentiates into the individual. This aggregate alone is dissolved in the process known as death.

Kölliker cannot accept this theory. Every organ begins in a mass of embryonic cells, from which parts may be renewed if lost. Cells that have differentiated may, under proper circumstances, regain their germinal power. The buds that appear at various points of a mass of embryonic vegetable tissue, essentially reproduce the structure of the individual. In plants, the germinal cells can not be said to be set apart early in life. (Compare also adventitious buds.) Even in the adult animal organism, occur embryonic cells, such as osteoblasts and odontoblasts, the deep cells of the epidermis, cells of many glands, lymph cells, and germinal cells. The last are themselves, like other cells, differentiated in a particular direction, some forming eggs and some spermatozoa. All asexual reproduction, such as fission, budding, parthenogenesis, shows that other cells besides germinal cells, can reproduce the organism. It would be an interesting inquiry to ascertain what circumstances cause the cells to reproduce the whole body or only a part. It is not necessary to hold the early differentiation of germinal cells, nor to locate them for all animals in the same embryonic layer, since all cells are primarily germinal cells like the fertilized egg; and according to the function they are to serve in the adult, they differentiate into the appropriate tissues.—*J. Nelson.*

The Retrograde Metamorphosis of Siren.—I have already pointed out (Naturalist, 1885, p. 245) that palæontology shows that the Batrachian order of Trachystomata, which embraces the Sirenidæ, is a degenerate type, if the structure of its skull, limb-arches and limbs be considered. I have now reason to believe that there are indications of a retrograde metamorphosis to be found in the history of its branchial apparatus. I have been for a long time at a loss to account for the curious condition which I have frequently observed in the branchiæ of the Sirens. The

fringes are frequently in a state of apparent partial atrophy, and enclosed in a common dermal investment of the branchial ramus, or all the rami are covered by a common investment, so as to be absolutely functionless and immovable. This character, observed in the *Pseudobranchus striatus*, gave origin to its separation from the genus Siren. The character is, however, common to the *Siren lacertina* at a certain age, and the real difference between the genera depends on the different number of the digits in the two.

I have been more than ever surprised on discovering that the functionless condition of the branchiæ is universal in young individuals of *Siren lacertina* of five and six inches in length; and lately I have observed that in a specimen of a little over three inches they are entirely rudimentary and subepidermal. I have, in fact, noticed that it is only in large adult specimens that the branchiæ are fully developed in structure and function. The inference from the specimens certainly is that the branchiæ are in the Sirens, not a larval character, as in other perennibrachiate Batrachia, but a character of maturity. Of course, only direct observation can show whether Sirens have branchiæ on exclusion from the egg; but it is not probable that they differ so much from other members of their class as to be without them. Nevertheless, it is evident that the branchiæ soon become functionless, so that the animal is almost, if not exclusively, an air-breather, and that functional activity is not resumed till a more advanced age. That Sirens may be exclusively air breathers I have shown by observations on a specimen in an aquarium which for a time had no branchiæ at all. (See Journal Academy Phila., 1866, p. 98.)

In explanation of this fact it may be remarked that this atrophy cannot be accounted for on the supposition that it is seasonal and due to the drying up of the aquatic habitat of the Sirens. The countries they inhabit are humid, receiving the heaviest rainfall of our Eastern States, and there is no dry season. The only explanation appears to me to be that the present Sirens are the descendants of a terrestrial type of Batrachia which passed through a metamorphosis like other members of their class, but that more recently they have adopted a permanent aquatic life, and have resumed their branchiæ by reversion.—*E. D. Cope.*

RECENT ADDITIONS TO THE MUSEUM OF BROWN UNIVERSITY.—Of late there has been made at this institution considerable effort to secure indigenous representatives of the animals which occur in the neighborhood of the college, and especially of such as are likely soon to be exterminated from the narrow bounds of Rhode Island, the most thickly settled State of the Union. Within a few weeks there has been secured a local representative of Blanding's box tortoise (*Emys meleagris*), an animal well deserving a position in the cabinet, as both an early describer, Dr. John E.

Holbrook, and the person to whom he dedicated the species, Dr. William Blanding, were graduates of this college. A representative of the musk turtle (*Aromochelys odoratus*) is interesting in that it is a giant of its species, the carapax measuring four and one-half inches in length. An otter (*Lutra canadensis*) is also worthy of note, as it is an animal extremely rare in this region. This specimen was shot on the island of Rhode Island, and was large and in excellent condition, a state of health somewhat different from that presented by an emaciated wild cat (*Lynx rufus*), captured in the more southern portion of the State, and probably the last Narragansett representative of its species.

Perhaps the most interesting acquisition is that of a hoary bat (*Atalapha cinereus*). This animal, a beautiful female, was found a few miles from Providence, on a pine tree which had been recently felled. Dr. C. Hart Merriam, in writing of this species, says: "From its almost boreal distribution, and extreme rarity in collections, the capture of a specimen of the hoary bat must, for some time to come, be regarded as an event worthy of congratulation and record. Although I have been fortunate enough to shoot fourteen, I would rather kill another to-day than slay a dozen deer."—*H. C. Bumpus.*

ZOOLOGICAL NEWS.—*Echinoderms.*—Twenty species of Echini were, according to Mr. R. Rathbun, collected during the expedition of the *Albatross* in 1884. They include *Homolampas fragilis* and *Aceste bellidifera.* The latter species was only obtained by the *Challenger* in the vicinity of the Canaries, and was not found by the *Blake* in the Gulf of Mexico. The *Albatross* obtained it off the east coast of the United States, in 1497 fathoms.

Crustaceans.—S. J. Smith describes *Eunephrops bairdii*, n. gen. and sp., a relative of Homarus (Proc. U. S. Nat. Mus., 1885, 167). The writer compares the species throughout with *Nephrops norvegicus.* The genus agrees with Homarus in the number and arrangement of the branchiæ, with Nephrops and Homarus in possessing antennal scales and well-developed eyes; with Nephropsis in having very large antennal spines, and with Nephrops in its slender and carinated chelæ. One specimen, female, was dredged by the *Albatross* in the Gulf of Darien, 155 fathoms.——The same naturalist also contributes a paper upon some genera and species of Penæidæ, mostly from recent dredgings of the United States Fish Commission. The new species are *Parapenæus megalops* and *goodei*, *Hymenopenæus robustus* and *modestus.*

Mollusks.—W. H. Dall contributes notes on some Floridian land and fresh-water shells, with a revision of the Auriculacea of the Eastern United States. *Hydrobia wetherbyi* and *Pupilla floridana* are described as new, also *Sayella crosseana* and *Onchidium floridanum.*

Fishes.—D. S. Jordan and S. E. Meek (Proc. U. S. Nat. Mus., April 20, 1885) give a list of fishes collected in Iowa and Missouri, with descriptions of the new species, *Notropis gilberti* and *Ammocrypta clara.*——S. Garman (l. c., April 23) describes as new *Mylobatis goodei*, from Central America; *Dasybatus kuhlii; D. varidens*, from Hong-kong; *Urolophus nebulosus*, from Colima, Mexico; *U. fuscus*, from Niphon; *Raja fusca*, also from Japan; *Raja senta*, from deep water off the coast of Massachusetts, and *R. jordani*, from San Francisco, California.——D. S. Jordan and S. E. Meek (Proc. U. S. Nat. Mus., 1885, 44) give the synonymy and an analytical key of the American species of Exocœtus. The authors admit seventeen species, fourteen of which they place in Exocœtus, while the remaining three are placed in three other sub-genera. Most of the species have a very wide range. *E. californicus* is probably the largest species. ——A study of the skulls and vertebræ of twenty species of Etheostomatinæ or darters, made by D. S. Jordan and Carl H. Eigenman, has induced the former to replace these little fishes in the Percidæ. "The Etheostomatinæ are near allies of the Percidæ, and should not form a separate family."——T. H. Bean (l. c. 73) describes *Plectromus crassiceps*, a single example of which was taken by the *Albatross* at the greatest depth explored, viz., 2949 fathoms, and three other examples at lesser depths. The same ichthyologist describes *Aspidophorides güntheri*, from Alaska.——A writer in the Bulletin of the U. S. Fish Commission states that he has been a witness to the destruction of just-hatched trout by mosquitoes. When a young fish came to the surface in the sunshine, a mosquito immediately transfixed its brain with its proboscis, and held on until the life juices were sucked away, when the dead trout floated down stream. The locality was the Gunnison valley, Col.——Mr. J. A. Ryder has contributed to the Proceedings (U. S. Nat. Mus., 1885), a most valuable paper upon the development of viviparous osseous fishes. He quotes the observations of Girard and Blake upon the Embiotocidæ of the Pacific coast, and adding observations of his own upon the gravid females of three species, arrives at the conclusion that: (1) the hypertrophied hind gut of embiotocid embryos, clothed internally with crowded villi of great length, has probably a digestive function, enabling the young fish to assimilate the nutriment contained in the abundant fluid given out by the walls of the ovarian sac; and (2) that the great development of the interradial membrane of all the vertical fins, and the abundance and size of the blood vessels which supply that membrane, are mainly for the purpose of effecting respiration through the skin. In the later stages of development the protruding hind gut commences to diminish in size. In *Gambusia patruelis* each egg and egg-sac has its own independent supply of blood from the mother's arterial system. The

male is scarcely one-sixth the weight of the female. There is no trace whatever in the egg follicles of Gambusia of an independent egg membrane. The developing young of Gambusia obtains no nutrition from its parent.——The same ichthyologist contributes a paper on certain features of the development of the salmon.——Dr. Bean describes *Stathmonotus hemphillii*, a small fish from Key West, Fla., related to Muraenoides.

Batrachians.—O. P. Hay (Proc. U. S. Nat. Mus. 1885, p. 209), describes as new *Amblystoma copeianum*, from Indiana. It is without the yellow spots of *A. tigrinum*, has a lateral brown band, a broader and more depressed head, a more compressed tail, and longer limbs than *A. tigrinum.*——The brothers P. B. and C. F. Sarason show that the genus Epicrium is not viviparous, as is Cæcilia, but oviparous. In the most advanced stage before hatching, the embryo is provided with very long blood-red external gill-filaments, and has also a distinct tail with a strong fin. The gill-filaments are shed previous to hatching, after which the young Cæcilians make their way to the neighboring stream, in which they breathe by means of gill-slits. After they leave the water their gill-slits close up, and they breathe by lungs. There is a fourth gill-arch, from which the pulmonary artery is given off. The spermatozoön has a spiral filament. The last two facts tend to show that the Cæcilians are nearer to the Urodela than to the Anura.——It has been shown that the old species *Rana temporaria* contains many specific forms that have been confounded because of great resemblance in coloration and habits. M. G. A. Boulenger distinguishes eight species of red frogs or *Ranæ temporariæ*, viz., *R. fusca, arvalis, sylvatica, iberica, latastei, japonica, agilis, and pennsylvanica.* Exteriorly these forms differ in the greater or less length of the pelvic members, the shape of the head, the size of the tympanum, the greater or less development of the tubercle of the first cuneiform bone, the presence or absence of the vocal sacs in the male, etc. The vomerine teeth differ as do also the genital organs of the males. In the species with vocal sacs, or at least in *fusca* and *arvalis*, the throat of the males becomes blue in spring, and a bluish tint invades the skin. The arms of the males, always more robust than those of the females, become thicker still in the rutting period, and the thumb then becomes covered with rugosities. Copulation takes place at the end of winter or in early spring, when the males may be seen firmly seated on the females, with their arms around them and their hands joined over the breast. *R. sylvatica* and *R. pennsylvanica* are American, *R. japonica* is found in China and Japan and the others are European. *R. fusca* is found in most of Europe, except Southwest France and Spain; *R. arvalis* is found in the Northeast of Europe and probably in Northern Asia; *R. iberica* is limited to Spain and Portugal; *R. latastei* is found in Northern Italy, and *R. agilis* in

France, Switzerland and Northern Italy.——G. A. Boulenger calls attention, in the *Zoölogist* to the existence of two kinds of aquatic frogs in North Germany. Though included as sub-species of *R. esculenta*, they can be distinguished from each other at first sight, and breed at different times of the year. In the typical *R. esculenta*, the inner metatarsal tubercle is compressed and large, and the black marbling of the flanks and hinder side of the thighs encloses more or less of bright yellow; while in the larger variety, *R. fortis*, the inner metatarsal tubercle is small, elongate, and feebly prominent, and there is no yellow on flanks or thighs. The whole physiognomy is different and the fact that the larger kind breeds earlier keeps the breeds pure.

Reptiles—G. A. Boulenger describes *Agama doriæ*, a new lizard from Bogos in Northern Abyssinia. In proportions and characters of the scales it is similar to *A. colonorum*, between which and *A. bibronii* it is intermediate.——Dr. O. Boettger's list of the reptiles and Batrachia of Paraguay, comprises sixty-three species collected by H. Rohde, of which nineteen are lizards and twenty-four snakes. The new lacertilian genus Micrablepharus, is instituted for *M. glaucurus*, and other new species are *Amphisbæna albocingulata*, *Lepidosternum boulengeri*, *strauchi*, *affine* and *onychocephalum*, *Mabuia tetratænia*, *Liophis genimaculata*, *Rhinaspis rohdei*, *Leptognathus cisticeps*, and the batrachians *Engystoma albopunctatum* and *mulleri* and *Leptodactylus diptyx*.

Birds.—The collection of "Birds of the British Asian Empire," recently donated to the British Museum by Mr. O. O. Hume of Simla, contains 63,000 skins of birds, 300 nests, and 18,500 eggs. It contains about 2000 species, each represented by some thirty examples, mostly representing different stages of growth or degrees of variation. Mr. Hume has been the best authority on Indian ornithology, and intended to publish a work on the "Birds of the British Asian Empire," but other duties, and the loss by theft of his manuscripts, determined him to donate his collections to the British Museum, that they might be worked up by Mr. Sharpe.——R. Ridgway (Proc. U. S. Nat. Mus., April 20, 1885) describes a new more brightly colored variety of *Icterus cucullatus* from Yucatan; *Centopus pileatus* from some part of Tropical America; *Cyanocorax cucullatus* and a variety of *Vireolanius pulchellus* from Costa Rica, and *Certhiola finschi* and *C. sundevalli* from the Lesser Antilles. Mr. Ridgway also gives a key to the species of Certhiola (honey creepers) and gives the name of *Branta minima* to a very small form of barnacle goose which breeds in Western Alaska and migrates south to California in winter. *Onychotes* (*Buteo*) *gruberi* Ridgway, formerly thought to be a Californian bird, is now by its original describer, on the faith of a plate published in the report upon the birds of the *Challenger* Expedition, considered a synonym of *Buteo solitarius*, from the Sandwich islands. Mr.

Ridgway also describes *Cancroma zeledoni*, from Central America, and *Rupornis gracilis*, from Yucatan.——L. Steyneger describes (*l. c.*) a new species of tree-sparrow (*Passer saturatus*) from the Liu-kiu islands.——José C. Zeledon contributes to the Proc. U. S. Nat. Mus., a list of the birds of Costa Rica, 692 species in all.——L. M. Turner gives (*l. c.*, 233) a list of the birds of Labrador from Hudson strait to the Gulf of St. Lawrence, and west to 82° W. long., 764 species in all.

Mammals.—F. W. True (Proc. U. S. Nat. Mus., 1885, 95) describes as new *Phocæna dalli*, and reduces the previously described species of porpoise to three, viz: *P. communis*, *P. lineata*, and *P. spinipinnis*. In coloration, in the form of the head, and in the much larger number of vertebræ, *P. dalli* approximates Lagenorhynchus. A cordate area of white occupies the belly and lower half of the sides; the beak is shorter and the temporal fossæ smaller than in *P. communis;* the vertebræ are ninety-seven or ninety-eight in number, instead of sixty-six, as in *communis*, and the dorsal fin is concave on its posterior margin. The Aleuts, according to W. H. Dall, recognize this species as distinct from the smaller *P. vomerina* (= *communis* ?).

EMBRYOLOGY.[1]

The Development and Structure of Microhydra ryderi Potts.—The discovery and prolonged observation in the living state of this remarkable fresh-water cœlenterate, which is obviously allied to Hydra, is due to the painstaking care of Mr. Edward Potts, who found it adherent to stones to which fresh-water Polyzoa were attached, which he brought from Tacony creek, near Philadelphia. Mr. Potts has named the animal for the writer,[2] to whom he has also turned over three series of sections, prepared by Mr. Harold Wingate, from three individuals. Fortunately two of these series of sections, one a slide containing forty-two transverse, and another nine longitudinal sections, enables me to make a very thorough comparison with the structure of Hydra as displayed in a series of sections of *H. viridis* and *H. fusca*, from both of which Microhydra differs not only in size but also in histological details as well as in its mode of development. This singular organism also differs widely from the marine *Protohydra leuckartii* Greef, in being very much smaller, and in being an inhabitant of fresh water; it also differs from Protohydra in its method of reproduction by gemmation from the side of the body instead of by transverse fission. In this last

[1] Edited by John A. Ryder, Smithsonian Institution, Washington, D. C.

[2] *Science*, Vol. v, 1885, No. 123, in the accompanying cover sheets, called the *Science Bulletin*, p. v, under the head of Recent Proceedings of Societies, the name *Microhydra ryderi* was first published, together with a brief account of its structure and habits, as a report of a verbal communication made by Mr. Potts at the meeting of the Academy of Natural Sciences of Philadelphia, held May 19, 1885.